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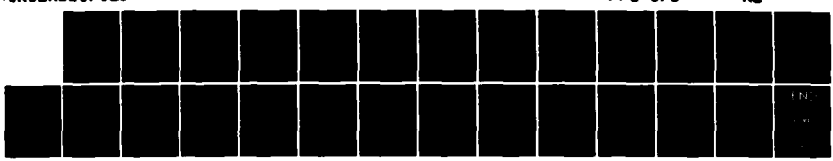

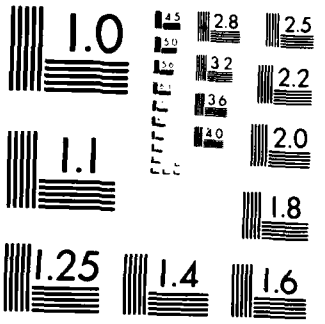

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TO PAY OR NOT TO PAY: A MODEL OF INTERNATIONAL DEFAULTS

Daniel F. Kohler

October 1984

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I. INTRODUCTION

International loans, especially those made to foreign sovereign lenders, differ in a number of ways from most loans made by domestic banks to residents of their own country. They are usually larger than most domestic loans, the lender has more difficulty in obtaining reliable data on the borrower, and, most importantly, lender and borrower are under different jurisdictions. This last factor makes enforcing a loan contract considerably more difficult, and provides incentives for the borrower to avoid prompt repayment, even if such repayment is feasible.

Guttentag and Herring (1983) equate the presence of such incentives loosely with "moral hazard."[2] Eaton and Gersovitz (1981) develop a formal model of lending (with a single borrower and multiple lenders acting in unison) that explicitly takes debt repudiation into account. In their model, borrowers are "inherently dishonest,"[3] i.e. they will default on their loans if their expected utility maximization so dictates. We prefer to characterize such behavior by the somewhat more neutral term "rational."

This paper simultaneously expands and simplifies the Eaton-Gersovitz model and places it in a game theoretic context borrowed from Dixit (1982). We consider only two time periods, the present and the future, and take lending decisions that were made in the past as given. We thus back away from the centerpiece of the Eaton-Gersovitz model, which deals essentially with a determination of total lending to one borrower, in favor of considering the repayment choice more closely. We expand the analysis by introducing a third option to repayment and default: rescheduling. We also consider several borrowers, whose decisions to repay or default are not independent of the lenders' and borrowers' actions in the past, since they use this information to estimate the probability that a lender will foreclose in response to nonpayment.

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Recent experience suggests that an increasing number of borrowers have chosen to seek a rescheduling, rather than repay their loans as originally planned. Banks appear to be helpless vis-a-vis such demands, and have usually agreed to a rescheduling. They correctly calculate that a recheduling offers at least the hope of recovering some funds in the future, while an outright foreclosure and default promises very little return. Most assets that could profitably be attached are under foreign jurisdiction and require the cooperation of the foreign government in a seizure action. If the borrower is the foreign government itself, seizing anything is practically impossible.

Such calculations, however, are correct only if each delinquent borrower is considered in isolation. If the horizon is broadened somewhat, it becomes apparent that this strategy of "rescheduling on demand" may be sub-optimal. Specifically if we allow for the possibility that borrowers who seek a rescheduling would choose to pay if the only other option was foreclosure, i.e. a rescheduling was not possible, then it becomes apparent that lenders may be granting reschedulings to borrowers who are only unwilling, but not unable, to repay their obligations.

Most research dealing with debt renegotiation has failed to address this issue. Guttentag and Herring (1983) discuss a number of proposals aimed at improving the debt renegotiation process, without considering the effect such "improvements" would have on the number of countries that seek a rescheduling. Procedures that make debt renegotiation less costly for lenders and borrowers could, if implemented, provide additional incentives to borrowers to forego honoring their obligations.

It is not true that a borrower will seek a rescheduling only if he faces bankruptcy in the traditional sense, i.e. his obligations exceed his resources. In consideration of the borrower's incentives, Eaton and Gersovitz call such traditional criteria of inability to pay "essentially irrelevant." It is virtually impossible to determine whether the bankruptcy criteria are satisfied when the debtor is a country, as opposed to a corporation or an individual. It is also quite useless to do so, since no exogenous penalties can be imposed for "frivolous bankruptcy." The only penalties that a borrower has to

consider are endogenous (denial of future credit, disruption of trade flows), and default will occur if the borrower considers the discounted total costs of such sanctions to be less than the total benefits derived from avoiding repayment. We accept the Eaton-Gersovitz definition of default, and, as they do, we find that the probability of nonpayment increases with the repayment obligation and decreases with the resource endowment. However, we also consider that a borrower might want to reschedule--if not default--under some circumstances, and that he will therefore refuse payment if he expects the lender to agree to a rescheduling. This situation we call "unwillingness" to pay, without attaching any moral interpretation to the term.

It is in the lender's interest to provide incentives that reduce the probability that a borrower will be unwilling to pay. This calls for actions that go beyond the setting of debt ceilings. For example, the lender must now consider what effect his reactions to rescheduling requests have on the probability that other borrowers who are unwilling to pay might seek reschedulings as well. Like Eaton and Gersovitz, we assume that lenders act in unison, an assumption that seems to us less artificial in the context of dealing with delinquent borrowers than in the setting and observing of debt ceilings.

Section II presents the basic one-period model without uncertainty. In this simplified case it is indeed in the lender's interest to always reschedule, and borrowers, aware of this, will refuse repayment, whenever they are unable or only unwilling to pay. In section II we consider some modifications to the basic one-period model which afford the lender some opportunity to limit the incentives to nonpayment. Section III then expands the analysis to multiple periods, where a lender faces an unwilling borrower repeatedly, or faces a different borrower each period. This situation offers the best opportunities for providing strong repayment incentives to borrowers whose obligations mature in the future, by letting some borrowers default, rather than agreeing to a rescheduling. In fact, we can calculate the optimal frequency with which a profit-maximizing lender should let unwilling borrowers default.

I. THE BASIC ONE-PERIOD MODEL

Consider a borrower who in period t receives the random endowment E_t (e.g., foreign exchange earnings). The distribution of E_t is known, so that the borrower also has an unbiased forecast of his expected endowment in the next period E^*_{t+1}. Furthermore, the borrower faces a repayment obligation in period t amounting to R. His expected utility, if he honors this obligation, is thus[1]

$$U_{B1} = U(E_t - R, E^*_{t+1}) \qquad (1)$$

The borrower's utility function is increasing in both its arguments. Continuing the foreign exchange example: increases in $E_t - R$ allow for more imports in the current period, and increases in E^*_{t+1} allow for more imports in the future period. Either situation, ceteris paribus, improves the borrower's welfare.

The borrower can usually improve his utility in the current period by not making payment R. This action can have two consequences: Either the lender agrees to a rescheduling under which the borrower promises to make the higher payment (1+d)R in the next period, or the lender forecloses on the borrower, forcing a default. In the first case (rescheduling) the borrower's utility function becomes

$$U_{B2} = U(E_t, E^*_{t+1} - (1+d)R) \qquad (2)$$

and in the second case

$$U_{B3} = U(E_t - bR, E^*_{t+1} - S) \qquad (3)$$

where bR is the value of assets which a lender can seize from a bankrupt borrower, and S is the cost of sanctions that the lender, possibly in concert with others, can impose on a bankrupt borrower. It includes

[1] We have subsumed any obligations maturing in the future under the borrower's expectation of future endowment E^*_{t+1}.

items such as increased difficulty in obtaining future credits and higher costs for simple trade finance instruments such as letters of credit and the like.[2]

Which one of the three possible outcomes is preferred by the borrower depends on d,b,S, and the borrower's rate of discount, i.e., the rate of transformation between present and future available resources. Consider Figure 1. The slope of the indifference curves is equal to $-1/(1+\Delta)$, where Δ is the borrower's discount rate. The points U^{o}_{B1}, U^{o}_{B2} and U^{o}_{B3} refer to a situation where the borrower would prefer to make the payment now. However, assuming the same values for d, b, and S, but increasing R^{o} to R' we can depict a situation (U'_{B1}, U'_{B2}, U'_{B3}) where the borrower prefers a rescheduling to making the repayment. Increasing R further to R" we ultimately arrive at a point where the borrower even prefers bankruptcy to paying now, despite the sanctions involved (U''_{B1}, U''_{B2}, U''_{B3}). The same results could be obtained by holding R steady and reducing E_t instead.

In the first situation, where the borrower prefers paying now over either of the two alternatives, he will make the payment as scheduled. In the other two cases there exists a possibility for the borrower to improve his welfare by refusing payment. If he does so in the second case, where $U'_{B2} > U'_{B1} > U'_{B3}$ we consider him "unwilling" to repay while in the last case, where both alternatives are preferred over paying now ($U''_{B2} > U''_{B3} > U''_{B1}$), the borrower is considered "unable" to make payment.[3]

These are somewhat unorthodox definitions of inability and unwillingness to repay. Traditionally, a borrower is considered unable to pay if $E_t - M_{min} < R$, where M_{min} is an agreed-upon "subsistence" minimum (e.g., "essential" imports). Obviously, this definition gives

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[2] See Eaton and Gersovitz (1981) and Allen (1983). We also assume that foreclosure and default are irreversible acts. If a borrower could reverse a default action at little or no cost, any threat of foreclosure would be incredible on its face, and borrowers would continuously test the system by refusing to pay.

[3] The situation where default (debt repudiation) is preferred over both other alternatives, though theoretically possible, is not discussed. We assume that S is so large as to make default undesirable under most circumstances. Furthermore, the borrower always has the option of agreeing to a rescheduling and then reneging on the rescheduled payment when it becomes due. Cline (1984) alludes to this possibility for the cases of Nicaragua and Poland.

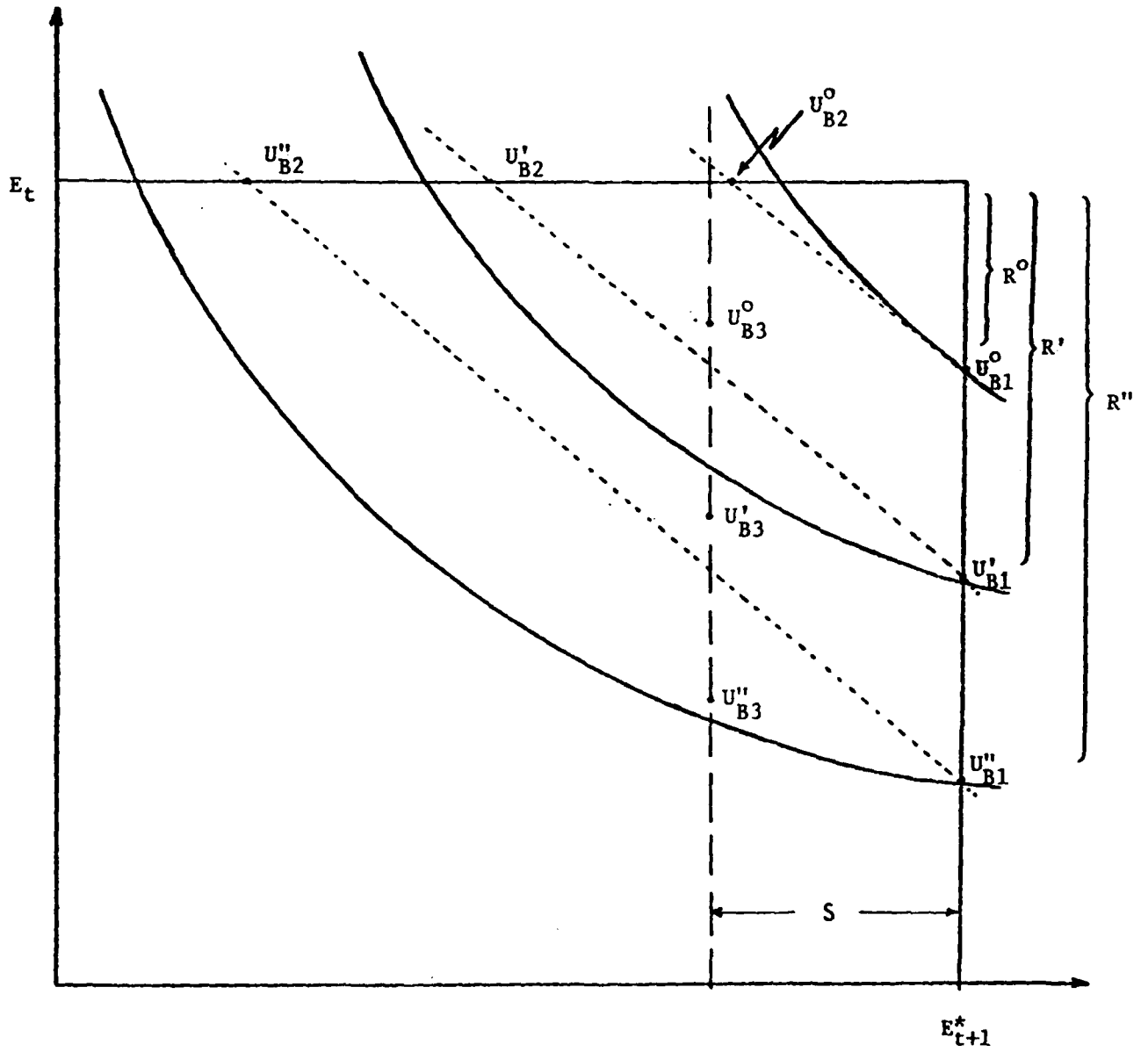

Fig. 1: Borrower's preference ranking for three different values of R

way to endless haggling among lenders and borrowers over the size of M_{min}. During rescheduling negotiations lenders frequently insist on stabilization packages intended to reduce M_{min} (Hardy, 1982). The borrower is considered unwilling to repay if he inflates M_{min} and refuses to agree to measures to reduce it.

The two alternative definitions, however, are not inconsistent. Since a borrower can always force a default, U_{B3} is the lowest possible level of utility he can be made to accept. This defines the lowest value of M_{min} that a borrower will agree to and thus the inability-to-pay threshold. Unwillingness to repay is accordingly defined as the situation where a borrower bargains with the lender(s) for a higher value of M_{min} in order to be granted a rescheduling, but would, if faced with foreclosure, prefer to pay now.

For the lender we assume a simpler preference structure. Specifically we assume that the lender is risk neutral, that he has unlimited access to financial markets, as a lender or borrower, and that R is too small to cause price changes in these markets. Therefore we can discount the lender's payoff from each possible outcome to the current period and rank them directly. For the first outcome, where the borrower makes payment R as scheduled we have simply

$$U_{L1} = R \tag{4}$$

For the second outcome (rescheduling), we get

$$U_{L2} = (1-w)(1+d)R/(1+r) \tag{5}$$

where w is a measure of risk[4] representing the probability of not receiving a fraction of the rescheduled payment, and r is the risk-free market interest rate. In case of default, the lender's pay-off becomes

$$U_{L3} = bR \tag{6}$$

[4] This measure of risk is not exogenous but rather represents a rational expectations forecast.

where we have assumed that the imposition of sanctions in the next period is costless for the lender.

The rescheduling terms d are negotiated between the lender and the borrower. The hardest terms that the lender can hope for are those that equate the right-hand side of (5) to R. If d was higher, the borrower could always borrow R from another lender at an interest rate that equates the expected future repayments, adjusted for risk, to R and pay off the first lender. It follows that a lender will prefer being repaid to having to agree to a rescheduling.

As was pointed out in the introduction, b (the share of debt recoverable through seizure) is very small in most international sovereign loans. It thus follows that lenders usually prefer a rescheduling to an outright default. This result is strengthened if we allow for the possibility that imposing sanctions on the delinquent borrower is costly for the lender as well.

Of the three possible outcomes (repayment as scheduled, rescheduling, or default), the first is the most desirable from the lender's point of view. He receives a payment valued at R. But whether or not to make repayments as scheduled is up to the borrower, and the lender can exert only indirect influence. Once the borrower has decided not to make the payment as scheduled, the lender must decide whether to call for a formal default or to negotiate a rescheduling. Of these two choices, he clearly prefers the latter.

The resulting game is given by Figure 2. The returns to the borrower and lender respectively are also given. Since for the lender the return to a rescheduling has to be weighted by the probability of actually receiving the rescheduled payments, it is lower than the return to repayment as scheduled. Accordingly, the lender prefers the first outcome. But he has no way of forcing this solution. It is an equilibrium outcome only if the borrower also prefers it over the other two alternatives (see U^o_{B1}, U^o_{B2} and U^o_{B3} in Figure 1). In this case the loan is repaid as scheduled and no conflict exists.

If the borrower does not pay, the lender has to choose between foreclosure and rescheduling. Since his return to foreclosure is usually very small, he will almost certainly enter rescheduling

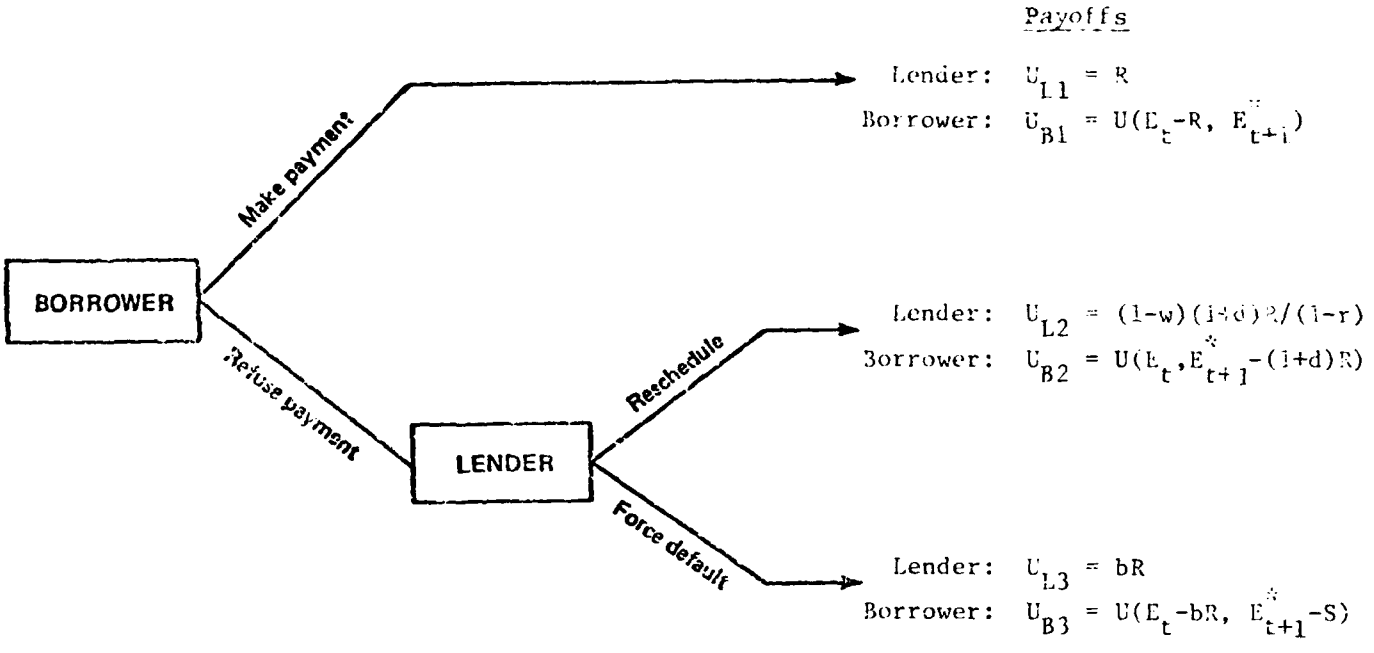

Fig. 2: The one-period strategic game

negotiations. In this case, and adhering for the time being to the one-period framework, a rescheduling is in the lender's interest.

This fact is not lost on the borrower. He will not believe any threats of foreclosure and refuse payment whenever he is unable or just unwilling to pay. He can force the outcome he prefers (rescheduling), denying the lender his preferred outcome (repayment). Rescheduling is a perfect Nash equilibrium.

Allen (1983) in his conclusion explicitly recognizes the problem of credible threats, but only with respect to whether sanctions in case of default will be imposed or not. In our model the problem of incredibility of threats is with respect to whether lenders will face a default at all. And here we conclude for the simple one-period case with perfect information that the threat is incredible which affords opportunities to borrowers unwilling to make payments.

Once the borrower has decided to refuse payment, there is little that the lender can do. He may try to initiate foreclosure procedures, but unless the borrower believes that the lender will cut off his nose to spite his face (i.e., believes that the lender will act against his own self interest), such a course of action will not induce the borrower to make payment. He will simply not believe that the lender will carry through on his threat and call the bluff.

III. ANTICIPATION AND UNCERTAINTY

ANTICIPATORY MOVES BY THE LENDER

Fortunately, there are ways in which the lender can improve his position. If he can bind himself in some way that would make it in his own interest to force a default, rather than agree to a rescheduling, he changes the game for the borrower. The borrower is now faced with the option of either making the scheduled payment or facing certain foreclosure.

Examples of such anticipatory moves are actions by the lender that reduce his relative costs of foreclosure to rescheduling. It does not matter whether this is achieved by reducing the costs of foreclosure or increasing the costs of rescheduling to the lender. By securing collateral, for example, the lender can increase his return to default (b). This can be achieved by side agreements which require the borrower to conduct some of his business with banks or companies that are within reach of the lender, so that any transactions balances can be seized in case of a default.

An interesting example of this technique is provided by the private political risk insurance industry. At least one company which insured credits to Poland in 1980 and 1981 covered itself by having one of its subsidiaries enter profitable joint venture agreements with the official Polish insurance company. In this particular case, the joint venture insured international shipping, with the American subsidiary acting as the principal agent and thus collecting the premiums. In case of a default on the loans insured by the political risk subsidiary, the shipping risk subsidiary would cease transferring any premium receipts to the Polish company and instead turn them over to the political risk subsidiary. The important part in this arrangement is not that this would tend to punish the borrower, but rather that it would reduce the lender's costs of forcing a default. This particular insurance company has suffered minimal losses from its Poland accounts.

Another, and often more effective way for the lender to convince the borrower that he will foreclose in case of nonpayment, is to enter into agreements which make the rescheduling option more costly to the lender than the foreclosure option. If the borrower is aware of the fact that in case of nonpayment it is less costly for the lender to force a default than to agree to a rescheduling, he will be faced with a choice between paying on time or facing foreclosure.

One such commitment is for the lender to write all the loan contracts in such a way as to grant all borrowers identical terms. If concessions are made to one borrower, identical concessions would have to be made to all other borrowers as well. This would increase the costs of a rescheduling considerably, especially for lenders who lend to many borrowers. As a consequence, it might well be in the lender's interest to let one borrower default, rather than to have to make special concessions to all the borrowers.[1]

Such an agreement must be irrevocable or at least very costly to terminate. If the lender can easily back out of such an agreement, he is not committed to forcing a default in case of nonpayment. His implied threat to the borrower: "If you don't pay on time we will force you into default," is no more believable than it was before.

The same holds true for actions which punish the borrower in case of default without increasing the return to the lender, such as imposing stiffer sanctions (increasing S). This has the effect of increasing the relative cost to default for the borrower, but leaves the lender's returns unchanged. It is thus no more likely than before, that the lender will foreclose in response to nonpayment. From the point of view of a borrower who is unwilling to pay, the increased sanctions are irrelevant, since he correctly expects the lender to opt for a rescheduling anyway. This result is strengthened if imposing sanctions is costly to the lender as well.

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[1] Such anticipatory moves need not affect the borrower's payoff function at all. In this example, the borrower can be discouraged from withholding payment by an action that has absolutely no influence on the return he gets from each possible outcome. For an excellent treatment of such pre-commitment strategies see Schelling (1960).

UNCERTAINTY

If the borrower is uncertain as to whether the lender's pay-off function favors a rescheduling rather than a default, he has to consider the possible consequences of a default. His expected payoff function is now a probability weighted sum of the two outcomes in case of nonpayment, default and rescheduling. As long as the borrower believes that there is a non-zero probability that the lender will see it in his interest to let the borrower default rather than reschedule, any action that raises the default cost to the borrower will lower the expected payoff from nonpayment.

Private political risk insurers consciously use this to guard against losses. They typically prohibit their policyholders from disclosing the existence of the policy to the borrower. This is an attempt to prevent the borrower from knowing the lender's payoff function and has the effect of reducing his expected return from nonpayment.

In contrast to the case considered above, increasing S to a borrower who is uncertain about the lender's payoff function may be an effective deterrent to nonpayment. Since default is an outcome that is at least possible, if not likely, costs to default do have an influence on the expected payoff to nonpayment for the borrower. However, if the imposition of sanctions is also costly to the lender, higher sanctions may have the effect of reducing the probability of foreclosure, which might offset the effect of a higher S on the borrower's payoff. In other words, foreclosure may simultaneously be more costly to the borrower but also less likely to occur.

IV. REPEATED PLAYS AND REPUTATION

FINITE HORIZON

The same lender may face the same borrower repeatedly over time, or face different borrowers at different times. Assume that a single borrower's strategy does not extend past one period and that the different borrowers do not cooperate.[1] The perfect information assumption assures that each time a borrower faces the decision of whether to make a scheduled payment or not, he is fully informed about all previous decisions by borrowers and lenders, as well as their consequences. Also assume that the lender's payoff function is completely known by everyone.

The t^{th} borrower's payoff function depends on the random endowment E_t. We assume that the lender cannot distinguish between borrowers who are unable to pay, i.e. who would prefer default over paying, and those who are unwilling to pay because they prefer a rescheduling, but would pay if they were certain that nonpayment would result in a default. Given that to make such a determination the lender would have to be able to observe the borrower's utility function, it does not seem unreasonable to assume this slight informational uncertainty.

If a game with a single equilibrium is repeated over a known finite time horizon, it collapses back to the one-period game previously analyzed. This can be seen readily by backward induction. During the last period, the borrower is facing the lender in what is in effect a one-period game. Unless the lender has been able through some anticipatory moves to change his payoff function in such a way as to make default preferable to rescheduling, the borrower will be able to enforce a rescheduling. The borrower who must decide in the second to last period is aware of the fact that the lender will have to accept a rescheduling in the last period, and realizes that the lender can gain nothing by denying him a rescheduling now. Thus he will also be able to

[1] This makes the game formally analogous to the Chain-Store Paradox model in the industrial organization literature: An established monopolist faces a succession of would-be competitors. See, for example, Dixit (1982).

force a rescheduling. This argument can be continued until we come to the first period. The only strategic moves effective in this case are the same ones that are effective in the one-period game.

INDEFINITE HORIZON

If the game is played over an indefinite number of periods, the lender has an opportunity to follow strategies that deter borrowers from refusing to pay. For example, by refusing to reschedule in one period, the lender may be able to deter some borrowers whose debts become due in the future from refusing to pay. If the discounted benefit from such deterrence exceeds the loss from forcing a default in the present period, the lender may see it in his interest to make some borrowers default.

Consider two pure strategies for the lender. Strategy I involves never rescheduling and strategy II involves always rescheduling in response to nonpayment. As before, consider only those borrowers for whom $U_{B2} > U_{B1}$, i.e., those who prefer rescheduling to paying now. Let π_o be the probability that the borrower is unable to pay, i.e. he prefers default to paying now ($U_{B3} > U_{B1}$), and will choose not to pay, even if he is certain that the lender will not reschedule. The payoff to the lender under the two pure strategies is:

$$U_L^I = \sum_{t=0}^{\infty} \frac{R_t}{(1+r)^t} \{(1 - \pi_o) + \pi_o b_t\} \tag{7}$$

$$U_L^{II} = \sum_{t=0}^{\infty} \frac{R_t}{(1+r)^t} \{(1-w_t)(1+d_t)/(1+r_t)\} \tag{8}$$

The rescheduling terms d_t are negotiated for each borrower. There are some established rules that are usually followed (see Hardy, 1982). For example, it is customary to reschedule at "market" rates, defined as a specific spread above the London interbank offer rate (LIBOR). This spread varies inversely with the lender's perceived probability of repayment ($1-w_t$), the borrower's creditworthiness.[2] The net effect is

[2] See Edwards (1984) and Kohler (1984) for a discussion of risk spreads in international lending.

that the term $\rho_t \equiv (1-w_t)(1+d_t)/(1+r_t)$ varies much less over t than any one of its components. We will in fact assume that $\rho_t \simeq \rho$, approximately constant over time. We also assume that $b_t \simeq b$, a small fraction, possibly zero, approximately constant over time.

If $\pi_o = (1-\rho)/(1-b)$, then the lender is indifferent between the two strategies. If π is larger, his payoff will be larger under the second strategy and vice versa. In either case, however, it is possible that the preferred strategy is itself dominated by a mixed strategy.

THE OPTIMAL FORECLOSURE RATE

If the borrowers know that with a certain probability, say α, they will be forced into default if they don't pay, their expected payoff function to not paying becomes a probability weighted sum, i.e.,

$$U_B = U\{\alpha(E_t - bR_t) + (1-a)E_t,\ E^*_{t+1} - \alpha S - (1-\alpha)(1+d)R_t\} \qquad (9)$$

For a borrower who is unwilling (but not unable) to pay, this payoff no longer clearly dominates the payoff from making the payment, and the probability that a borrower will refuse payment changes. If $\alpha=0$, i.e., the borrower is certain to receive a rescheduling, then $\pi=1$. As α increases, π falls until for $\alpha=1$, $\pi=\pi_o$.

Under a mixed strategy, the lender's payoff function becomes

$$U_L^M = \sum_{t=0}^{\infty} \frac{R_t}{(1+r)^t} \{[1 - \pi(\alpha)] + \pi(\alpha)[(1-\alpha)\rho + \alpha b]\} \qquad (10)$$

where $\pi(\alpha)$ represents the probability that a borrower will refuse to pay, as a monotonic function of the probability that in case of nonpayment he will be forced into bankruptcy. We have $\pi(0)=1$, $\pi(1)=\pi_o$ and $\pi'<0$.

Differentiate U_L with respect to α to find the α^* that maximizes the payoff for the mixed strategy. The first order condition is

$$\pi'(-1 + (1-\alpha^*)\rho + \alpha^* b) + \pi\,(b - \rho) = 0 \qquad (11)$$

Solving for α^* yields

$$\alpha^* = \frac{\rho-1}{\rho-b}\,\frac{\eta}{\eta+1} \qquad (12)$$

where $\eta \equiv \frac{\pi'\alpha}{\pi}$ is the elasticity of π with respect to α.

As expected, if π is not responsive to α, i.e., $\eta=0$, then the payoff is maximized at $\alpha^*=0$. If refusing to reschedule is not deterring any additional borrowers from nonpayment, or alternatively, if granting a rescheduling to one borrower does not induce any additional ones to refuse payment, then the lender might as well reschedule every time a borrower refuses to pay up.

If $\eta \leq (\rho-b)/(b-1)$, then it is in the lender's interest to refuse all requests for reschedulings. For values of η between this lower bound and zero, there exists an interior solution. The lender can determine an α^* which fixes his mixed strategy so as to maximize his payoff.

REPUTATION

It is important that borrowers be aware of the lender's mixed strategy. They have to believe that the probability that they will be forced into default in case of nonpayment is at least equal to α^*. The value of α^*, as perceived by the borrowers, characterizes the lender's reputation. A reputedly "tough" lender would be believed to have an α^* close to one. A reputedly "soft" lender would be believed to have an α^* close to zero.

This perception by the borrower may or may not be accurate. The lender can improve on his mixed strategy payoff by driving a wedge between the borrower's perception of α^* and the α^* actually chosen by the lender. The maximum payoff possible would be the one where borrowers believed α^* to be one while in reality it was zero. In this case only those borrowers truly unable to pay would refuse payment, and all their payments would be rescheduled. The payoff is equal to

$$U_L^{MAX} = \sum_{t=0}^{\infty} \frac{R_t}{(1+r)^t} \{(1-\pi_o) + \pi_o \rho\} \qquad (13)$$

But if borrowers observe the lender's behavior, they will notice that their perceptions and the lender's actions are at odds with each other. They will update their perception of α^*, and the lender's reputation as "tough" will be eroded.

There might be ways of slowing down this process. By widely publicizing defaults, while keeping rescheduling arrangements secret, the lender can attempt to influence borrower's perceptions of α^* in a way favorable to him. However, this might be dangerous. If information about the existence of a few rescheduling agreements should leak out, the sheer fact that information had been kept from the borrowers might lead them to believe that the practice of rescheduling is much more prevalent than it actually is. The result would be a divergence of perception and reality detrimental to the lender. He would seem softer than he is.

Finally, if borrowers believe that α^* is positive, any increase in S will reduce the borrower's expected payoff from nonpayment. Threatening larger sanctions, especially if they are tied to an ex post determination by the lender of whether the borrower was indeed unable, or just unwilling, to pay, does have a deterrent effect. Of course, the borrower has to believe that in case of default the sanctions will actually be imposed. Given the situation in international financial

markets, and the generally competitive relationship among the major international lenders--private banks and governments--the borrower might be justified in discounting any threatened sanctions. But this raises an entirely new game of threats, credibility, and deterrence, which we shall avoid analyzing at this time.

II. CONCLUSIONS

A model has been developed that explains why some international borrowers find it in their interest to refuse or delay honoring their repayment obligations. Given an understanding of the incentives faced by the borrowers, it was then possible to derive lender strategies aimed at changing these incentives. Ultimately it was shown that it may be in the lender's interest to let some borrowers default, even hugh the costs of this action seem to outweigh its benefits, considered in isolation.

This result is based in part on the fact that lenders are not in a position to assess whether borrowers are unable or merely unwilling to pay. Guttentag and Herring (1983) refer repeatedly to this point, but in contrast to their recommendations, we conclude that reschedulings should therefore be made more costly, rather than less. With a certain optimal frequency, rescheduling costs should approach infinity (i.e. a rescheduling is refused), and unwilling borrowers should be forced into default. It should also be more costly for lenders to reschedule, if this can be achieved without reducing the costs to borrowers, n order to convince nwilling borroers tha the lnder may see i in his interest to let him default, rather than reschedule.

Our model, like Eaton and Gersovitz' (1981), is based on a view of non-payment as a conscious choice by the borrower. But we extend the analysis by introducing the rescheduling alternative and by considering the lender's reaction to non-payment by the borrower, and the borrower's expectations with regard to this reaction.

In essence, borrowers consider two things when deciding whether to make a payment as scheduled or not: One is the potential return to each possible outcome (payment, rescheduling and default), and the other is the likely probabiliy with which the lender might be willig to grant a rescheduling. Sanctions to default, which in the Eaton-Gersovitz model are an effective way of deterring nonpayment, turn out to be less effectie in our odel, because borrowers tend to attach a low probability to being forced into default in response to nonpayment. The most important ingredient in providing incentives for improved payment

performance in international loans is the lender's willingness to let some borrowers default. Such action tends to discourage unwilling lenders from testing the system and refusing payment, when in fact they are able to meet their obligations.

In this kind of a model, default is an endogenous event, rather than an exogenous random risk that lenders can only avoid through the imposition of ceilings on exposure. There still is a random element present in the current model; however, it is confined to the endowment E_t. A logical extension of the model would be to consider which actions by the borrower have an influence on E_{t+1}, and whether these actions depend on $E_t - R$. This could lead to a more complete explanation of when reschedulings are in the interest of both lenders and borroers.

Aother obvious extension would be to consider numerous lenders who may or may not cooperate in their strategies towards the borrowers. Problems such as preferential treatment of some borrowers and conflicting interests among groups of borrowers are ignored in the current model, even though they do appear to be common (Cline, 1984).

Despite such shortcomings, the model presented here does provide a coherent explanation of the international financial markets as we currently observe them. It also suggests strategies, by which international lenders might be able to improve the odds of being repaid in their favor. This is particularly true for official lenders, such as the US Export Import Bank and the Agriculture Department's Commodity Credit Corporation, who, along with their counterparts in other industrialized countries, have traditionally been very reluctant to adopt a togh stance tward delinquet foreign borrowers.

Over time, these official lenders have acquired a justified reputation as being "soft" on their delinquent borrowers. As a result they appear to be faced with substantially higher delinquency rates than their private counterparts. Private traders, who lend to finance their transactions, traditionally enjoy the toughest reputations.[1] They do not face the same political constraints as official lenders do, and most borrowers believe they would therefore feel little compunction to foreclose.

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[1]Kohler (1982) provides some anecdotal evidence to substantiate this claim.

It is this perception by borrowers that is at the heart of the problem. If borrowers do not believe that they will have to face foreclosure in case of nonpayment, they will not be deterred by the threat of sanctions to default. Any strategy aimed at improving repayment performance must deal with the problem of how the brrower perceives the lender's options and cannot confine tself to reinforcing incredible threats.

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